Canada, during routine public health measures of infectious disease control between April and August, 2009. In addition to standard contact tracing information, participants were asked to list all venues attended in the last 6 months where sexual partnering may have occurred. We constructed a sexual affiliation network by linking together persons infected with syphilis, and their named sexual contacts, to sex partner meeting venues. By transposing the sexual affiliation matrix and applying matrix multiplication we created two separate networks; a network of persons connected by venues and a dual network of venues connected by persons. Hierarchal clustering was performed to model patterns of individual patronage of venues, and network algebraic measures of centrality and permutation statistical methods were used to determine what type of venue connected the most individuals infected with syphilis.
Results 77% of participants reported meeting a sex partner at a social venue in the last 6 months. We identified a densely connected sexual affiliation network of 94 men who have sex with men (MSM), comprised of 18 cases of infectious syphilis and 76 named sexual contacts connected by 21 venues. In the network of sex partner meeting venues, Internet venues had higher degree centrality than non-internet venues ($p<0.05$). In the network of men connected by venues, hierarchal clustering detected a cluster of 35 men linked together by their patronage of three Internet venues see Abstract P1-S4.10 Figure 1. These three Internet venues had the highest degree centrality in the network of sex partner meeting venues and connected two thirds of all infectious syphilis cases.
Conclusions To our knowledge, this is the first study to use SNA of a sexual affiliation network to quantify the importance of places in an outbreak of infectious syphilis. Network analysis allowed identification of three key venues that connected individuals who were infected with syphilis. These venues could provide public health officials with an epidemiologic target for primary and secondary prevention strategies to prevent further dissemination of disease.

Epidemiology poster session 4: Methodological aspects: Outbreak evaluation

P1-S4.11 THE USE OF THE HISTORICAL LIMITS METHOD OF OUTBREAK SURVEILLANCE TO RETROSPECTIVELY DETECT A SYPHILIS OUTBREAK AMONG AMERICAN INDIANS IN ARIZONA

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Background In April 2007, an Indian Nation located in Southern Arizona declared an outbreak of syphilis among its tribe members. The Arizona Department of Health Services Sexually Transmitted Diseases Control Program (ADHS STDCP) was first alerted by the tribe about the increase in syphilis cases during January 2007, 6 months after the occurrence of the first case in the outbreak. At the time, the ADHS STDCP did not have a method in place to monitor surveillance data for the detection of an outbreak of any sexually transmitted disease occurring within the state.
Methods In January 2009, the Arizona Department of Health Services STD Control Program developed a syphilis outbreak detection system based upon a Historical Limits Comparison Method (HLCM) to monitor reported syphilis-related labs. The Southern Arizona Indian Nation outbreak was then retrospectively evaluated using the state surveillance database and the HLCM outbreak detection system.
Results Retrospective analysis of the HLCM system of the syphilis outbreak in Arizona indicates that, had this system been in place at the outset of the outbreak, the ADHS STDCP would have been alerted to the increase in syphilis-related labs reported from the tribal Indian Health Service centers between 10 and 12 weeks earlier.
Conclusions The use of the HLCM system of syphilis outbreak detection in Arizona would have alerted the state health department earlier to an increase in syphilis cases occurring on the tribal lands in Southern Arizona. Earlier awareness of the increase in cases would have allowed for earlier intervention and collaboration with the tribe to control the outbreak. The ADHS STDCP has since instituted this method of outbreak detection among identified high morbidity or high risk surveillance sites for both syphilis and gonorrhoea.

Epidemiology poster session 4: Methodological aspects: Neighbouring

P1-S4.12 USING NEIGHBOURHOOD-LEVEL POPULATION DATA TO GUIDE GONORRHOEA INTERVENTION, MONTRÉAL, QUÉBEC, CANADA, 2002–2009

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Background The reported incidence rate of gonorrhoea has more than doubled between 2000 and 2010 in Montréal, increasing in both genders and all age groups; however, it was particularly high in females aged 15 to 24. As the reasons for the increases among young women are not fully understood, we wanted to determine whether neighbourhood-level population characteristics were associated with incidence rates among them, to help target intervention strategies.
Methods Incident gonorrhoea cases were female residents of Montréal, aged 15 to 24, who met Québec's provincial gonorrhoea surveillance definition, with a notification date between 2002 and 2009. The unit of analysis was neighbourhoods—111 non-administrative boundaries defined by the Montréal Public Health Department, by grouping census tracts to maximise homogeneity of population characteristics. The dependent variable was the neighbourhood gonorrhoea incidence rate based on all reported cases and the neighbourhood population, for females aged 15 to 24; the independent variables included material and social deprivation indices, their combination and components, and ethnic origin. Adjusted incidence rate ratios (IRR) were estimated by negative binomial regression after exponentiation of the regression coefficients and show the change in the incidence of gonorrhoea for each unit increase in the independent variable. In the final model, independent variables were normalised to facilitate comparison of their IRR which represents the change in gonorrhoea incidence rate associated with an increase of one SD in the percentage of residents of a given ethnic origin.
Results A total of 837 cases were reported (cumulative incidence rate 5.6 per 100 000). Higher proportions of three ethnic origin groups were associated with higher neighbourhood gonorrhoea rates, even when deprivation indices were considered (Abstract P1-S4.12 table 1).

Abstract P1-S4.12 Table 1 Population characteristics associated with gonorrhoea rates among female residents of Montréal aged 15–24, 2002–2009

Independent variable	Incidence Rate Ratio (95% CI)	p value
% of the population whose origin is African	1.34 (1.20 to 1.49)	0.000
% of the population whose origin is Aboriginal	1.32 (1.19 to 1.46)	0.000
% of the population whose origin is Caribbean	1.19 (1.07 to 1.33)	0.001

Conclusions Customary methods for gonorrhoea surveillance consider individual characteristics of cases as risk factors for disease. However, gonorrhoea is clustered in neighbourhoods that have high